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Assistant Commissioner for Patents
Washington, D.C. 20231

Attorney Docket: P55842

Sir:

Submitted herewith is the following patent application:

Inventor: 1) YOUNG-CHAN KIM
Title: VIDEO DISPLAY APPARATUS WITH ON-SCREEN DISPLAY
PIVOTING FUNCTION

Please find attached hereto an application for patent which includes: Specification and Abstract,
Claims, original Declaration And Power of Attorney, Assignment, and a certified copy of the
foreign priority document identified below:

Verified Showing of Small Entity Status: NO

Drawings: Formal drawings, 7 sheets, Figures 1 through 10

Claim of priority under 35 U.S.C. §119: YES
The Republic Of Korea Application No. 19077/1999 filed on 26 May 1999.

**

FEE (see formula below): CHECKS ARE ENCLOSED CK #33812 (\$760.00) & #33813 (\$40.00)

Basic Fee \$380/760 \$760.00

Additional Fees:

Total number of claims in excess of 20: ___ times \$9/18 . \$0.00
Number of independent claims in excess of 3: ___ times \$39/78 \$0.00
Multiple Dependent Claims \$130/260 \$0.00
An Assignment is likewise enclosed: Recording Fee \$40 . . \$40.00
Filing Non-English specification \$0.00

TOTAL FEES FOR THE ABOVE APPLICATION **\$800.00**

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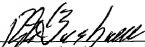
Assistant Commissioner is authorized to charge our Deposit Account No. 02-4943 for any **additional charges** necessary towards payment of the filing fee for the above-referenced application. Please notify the undersigned attorney of any transaction regarding our Deposit Account.

In view of the above, it is requested that this application be accorded a filing date pursuant to 37 CFR 1.53(b).

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Respectfully submitted,


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TITLE

**VIDEO DISPLAY APPARATUS WITH ON-SCREEN DISPLAY PIVOTING
FUNCTION**

BACKGROUND OF THE INVENTION

Technical Field

The present invention relates to a video display apparatus with an on-screen display pivoting function. More specifically, the present invention relates to a video display apparatus with an on-screen display pivoting function in which, even when the user arbitrarily pivots the monitor of a computer system, the on-screen display is normally displayed.

Related Art

Generally, a video display apparatus such as the monitor of a computer system has functions such that the user can arbitrarily adjust the brightness and size of the picture. In addition, such a video display apparatus typically has an on-screen display (OSD) capability.

Monitors associated with computer systems also have the capability of being rotated by 90 degrees about an axis passing from the front of the monitor to the rear thereof. However, when such rotation is carried out, the OSD on the screen of the monitor also rotates through 90 degrees so that the letters and figures of the OSD appear to be lying on their sides relative to their previous, unrotated appearance.

Thus, as a result of such rotation of the monitor, the user thereof is substantially

inconvenienced in that it is difficult for the user to see or accurately view the OSD.

SUMMARY OF THE INVENTION

The present invention is intended to overcome the above described disadvantage.

Therefore, it is an object of the present invention to provide a video display apparatus with an on-screen display pivoting function in which, even when a video display apparatus such as a monitor of a computer system is arbitrarily turned, the on-screen display can be displayed in a normal manner.

In achieving the above object, the video display apparatus with an on-screen display pivoting function according to the present invention includes: an OSD (on-screen display) generating section for receiving horizontal/vertical synchronizing signals and clock signals from an external source, and for outputting first video signals in response to OSD control signals from an outside source; a pivot circuit section for receiving the first video signals, for storing in a position-converting manner a write address of the first video signals in correspondence with a pre-set pivot write address, and for converting the write address in response to the horizontal/vertical synchronizing signals and the clock signals so as to output the first video signals in the form of second video signals; a scale converting section for furnishing the horizontal/vertical synchronizing signals and the clock signals to the OSD generating section and the pivot circuit section, respectively, and for receiving the second video signals so as to convert scales of the second video signals in response to scale control signals from an outside source; and a control section for furnishing OSD control signals and scale control signals to the OSD generating section and to the scale converting section, respectively, in

response to OSD driving signals (generated by a user), and for furnishing pivot control signals to the pivot control section in response to mode control signals (also generated by the user).

In another aspect of the present invention, the video display apparatus with an on-screen display pivoting function according to the present invention includes: a power supply section for supplying power; a display section for receiving the power from the power supply section, and for displaying a picture corresponding to video signals externally inputted by a user; a signal converting/clock generating section for receiving horizontal/vertical synchronizing signals and video signals, for converting the video signals to digital signals in response to first control signals (from an outside source), and for outputting clock signals; a decoder for receiving brightness/chromatic signals from an outside source so as to convert the brightness/chromatic signals to digital signals in response to second control signals (from an outside source); a frame rate converting section for receiving the horizontal /vertical synchronizing signals and the video signals from the signal converting/clock generating section, for receiving the brightness/chromatic signals from the decoder, for storing the video signals in response to third control signals (from an outside source), and for converting the video signals (thus stored) to a certain frequency ratio corresponding to display characteristics of a display section; an OSD (on-screen display) generating section for receiving horizontal /vertical synchronizing signals and clock signals from an outside source, and for outputting first video signals in response to OSD control signals from an outside source; a pivot circuit section for receiving the first video signals, for storing in a position-converting manner a write address of the first video signals corresponding to a pre-set pivot write address, and for converting the write address in response to the horizontal /vertical synchronizing signals and the clock signals

so as to output the first video signals in the form of second video signals; a scale converting section for furnishing the horizontal/vertical synchronizing signals and the clock signals to the OSD generating section and the pivot circuit section, respectively, for converting scales of video signals of the frame rate converting section, and for receiving the second video signals so as to convert scales of the second video signals of the pivot circuit section in response to scale control signals from an outside source; a control section for furnishing the first, second and third control signals to the signal converting /clock generating section, the decoder and the frame rate converting section, respectively, for furnishing OSD control signals and scale control signals to the OSD generating section and to the scale converting section, respectively, in response to OSD driving signals (generated by a user), and for furnishing pivot control signals to the pivot control section in response to mode control signals (generated by the user); and a driving section for furnishing the video signals and driving signals from the scale converting section to the display section.

In this video display apparatus with an on-screen display pivoting function, even if the screen body is turned by 90 degrees, the letters and figures of the on-screen display are displayed in the normal manner. Therefore, the user can use the on-screen display in a convenient way.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the invention, and may of the attendant advantages, thereof, will be readily apparent as the same becomes better understood by reference to the following detailed description when considered in conjunction with the accompanying drawings in which like reference symbols indicate the same or similar components, wherein:

Fig. 1 illustrates an on-screen display of a video display apparatus;

Fig. 2 illustrates an abnormal display of an on-screen display when the screen body is turned by 90 degrees;

Fig. 3 is a block diagram showing a video display apparatus with an on-screen display pivoting function according to the present invention;

Fig. 4 is a block diagram showing a pivot circuit section according to the present invention;

Fig. 5 is a block diagram showing another embodiment of the pivot circuit section according to the present invention;

Figs. 6 and 7 illustrate data maps which are stored in the case where the on-screen display pivoting function of the invention is not utilized;

Figs. 8 and 9 illustrate data maps which are stored in the case where the on-screen display pivoting function of the present invention is utilized; and

Fig. 10 illustrates the on-screen display displayed in the normal manner by the video display apparatus with an on-screen display pivoting function according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Fig. 1 illustrates an on-screen display of a video display apparatus.

As shown in Fig. 1, the on-screen display function is carried out on a screen 13 when the user manipulates a particular key of a key pad 15 to generate an on-screen display 14, the key pad 15 being located on a screen body 11 of the video display apparatus 10.

Fig. 2 illustrates an abnormal display of an on-screen display when the screen body is turned

by 90 degrees. As shown in Fig. 2, if the screen body 11 of the video display apparatus 10 is turned by 90 degrees, then the on-screen display 14 on screen 13 is also turned by 90 degrees. Therefore, the letters and figures of the on-screen display are laid on their side as viewed by the user. Accordingly, when the screen body 11 of the video display apparatus 10 is turned by 90 degrees, the user encounters a substantial inconvenience.

Fig. 3 is a block diagram showing a video display apparatus with an on-screen display pivoting function according to the present invention; Fig. 4 is a block diagram showing a pivot circuit section according to the present invention; and Fig. 5 is a block diagram showing another embodiment of the pivot circuit section according to the present invention.

Referring to Fig. 3, the video display apparatus with an on-screen display pivoting function according to the present invention includes: a power supply 1000 for supplying power (9 V or 12 V); a display panel 1100 for receiving power from the power supply 1000, and for displaying a picture of externally inputted R-G-B video signals to a user in response to driving signals; a signal converter/clock generator 100 for receiving horizontal /vertical synchronizing signals H/V SYNC and R-G-B video signals, for converting the R-G-B video signals to digital signals in response to first control signals (from an outside source), for generating clock signals, and for producing output signals 101; a decoder 300 for receiving brightness/chromatic signals (Y/C) from an outside source so as to convert the brightness/chromatic signals to digital signals 301 in response to second control signals 204 (from an outside source); a frame rate converter 400 for receiving the output signals 101 from the signal converter/clock generator 100, for receiving the digital signals 301 from the decoder

300, for storing R-G-B signals in response to third control signals 206 (from an outside source), for
 converting the R-G-B signals (thus stored) so as to have a certain frequency ratio corresponding to
 display characteristics of a display panel 1100, and for generating an output 401; a frame memory
 500 for storing the R-G-B signals for the signal converter /clock generator 100 under the control of
 the frame rate converter 400; an OSD (on-screen display) generator 700 for receiving horizontal
 /vertical synchronizing signals and clock signals 601 from an outside source, and for outputting first
 R-G-B signals 701 in response to OSD control signals 210 from a controller 200; a pivot circuit 800
 for receiving the first R-G-B signals 701, for storing in a position-converting manner a write address
 of the first R-G-B signals 701 in correspondence to a pre-set pivot write address, and for converting
 the write address in response to the horizontal /vertical synchronizing signals and the clock signals
 so as to output second R-G-B signals 801; a scale converter 600 for furnishing the
 horizontal/vertical synchronizing signals and the clock signals 601 to the OSD generator 700 and
 the pivot circuit 800, respectively, for converting scales of video signals of the frame rate converter
 400, and for receiving the second R-G-B signals to convert scales of the second R-G-B signals 801
 of the pivot circuit 800 in response to scale control signals 208 from an outside source; a controller
 200 for furnishing the first, second and third control signals 202, 204 and 206, respectively, to the
 signal converting /clock generator 100, the decoder 300 and frame rate converter 400, respectively,
 for furnishing OSD control signals 210 and scale control signals 208 to the OSD generator 700 and
 to the scale converter 600, respectively, in response to OSD driving signals (generated by the user),
 and for furnishing pivot control signals 212 to the pivot circuit 800 in response to mode control
 signals (generated by the user); and a panel driver 900 for receiving the R-G-B signals 602 from the

scale converter 600 and furnishing driving signals 901 to the display panel 1100.

Referring to Fig. 4, the pivot circuit 800 includes: a B-pivot circuit 800a for receiving B-data signals OSD-B of the first R-G-B signals 701 from the OSD generator 700, for storing in a position-converting manner a write address of the B-data signals OSD-B in correspondence with a pre-set pivot write address in response to pivot control signals 212, and for converting the write address in response to the horizontal /vertical synchronizing signals and clock signals 601 so as to output the stored B-data signals OSD-B in the form of B-data signals B of the second R-G-B signals 801; a G-pivot circuit 800b for receiving G-data signals OSD-G of the first R-G-B signals 701 from the OSD generator 700, for storing in a position -converting manner a write address of the G-data signals OSD-G in correspondence with a pre-set pivot write address in response to pivot control signals 212, and for converting the write address in response to the horizontal /vertical synchronizing signals and clock signals 601 so as to output the stored G-data signals OSD-G in the form of G-data signals G of the second R-G-B signals 801; and an R-pivot circuit 800c for receiving R-data signals OSD-R of the first R-G-B signals 701 from the OSD generator 700, for storing in a position-converting manner a write address of the R-data signals OSD-R in correspondence with a pre-set pivot write address in response to pivot control signals 212, and for converting the write address in response to the horizontal /vertical synchronizing signals and clock signals 601 so as to output the stored R-data signals OSD-R in the form of R-data signals R of the second R-G-B signals 801.

Referring to Fig. 5, the B, G and R-pivot circuits 800a, 800b and 800c, respectively, have

the same composition.

The B-pivot circuit 800a includes: an analog/digital converter 810 for receiving the B-data signals of the first R-G-B signals 701 from the OSD generator 700 so as to convert them to digital signals; a buffering section 820 for receiving and storing the digital B-data signals from the analog/digital converter 810, and for outputting previous B-data signals upon receiving next B-data signals from the analog/digital converter 810; a pivot controller 840 for outputting storing position control signals 841 and data selection control signals 842 in response to pivot control signals 212 from the controller 200; a data storing section 830 for receiving and storing the B-data signals of the buffering section 820, and for storing in a position-converting manner a write address of the B-data signals of the buffering section 820 in correspondence with a pre-set pivot write address in response to store position control signals 841; and a data selector 850 for receiving the B-data signals of the first R-G-B signals 701 or the B-data signals of the data storing section 830 so as to output the B-data signals of the first R-G-B signals 701 or the B-data signals of the data storing section 830 in the form of second R-G-B signals 801.

Under this condition, the buffering section 820 of the B-pivot circuit 800a includes eight buffers 820a, 820b, 820c, 820d, 820e, 820f, 820g and 820i for storing the 8-bit data of the analog/digital converter 810.

The compositions of the G-pivot circuit 800b and the R-pivot circuit 800c, respectively, are the same as that of the B-pivot circuit 800a. Further, the buffering sections of the G-pivot circuit 800b and the R-pivot circuit 800c, respectively, are the same as that of the B-pivot circuit 800a.

Now the operation of the video display apparatus with an on-screen display pivoting function

according to the present invention will be described.

Figs. 6 and 7 illustrate data maps which are stored in the case where the on-screen display pivoting function of the invention is not utilized. Figs. 8 and 9 illustrate data maps which are stored in the case where the on-screen display pivoting function of the invention is utilized. Fig. 10 illustrates the on-screen display displayed in the normal manner in the video display apparatus with an on-screen display pivoting function according to the present invention.

The case where the user does not turn the screen body 11 is the same as the conventional case and, therefore, the operation of this case will be omitted. The case where the user turns the screen body 11 clockwise by 90 degrees will be described.

Further, the operations of the components of the pivot circuit 800 will be described with reference to the B-pivot circuit 800a, because the operations of the G and R-pivot circuits 800b and 800c, respectively, are the same as that of the B-pivot circuit 800a.

First, referring to Fig. 3, the signal converter /clock generator 100 converts the incoming R-G-B signals to digital signals in response to the first control signals 202 of the controller 200. Further, the generator 100 generates clock signals 101 in response to the horizontal /vertical synchronizing signals so as to meet the operation criteria for the video display apparatus according to the present invention.

The decoder 300 converts the brightness/chromatic signals to digital signals 301 in response to the second control signals 204 of the controller 200.

The frame rate converter 400 writes the digital R-G-B signals of the signal converter /clock generator 100 into the frame memory 500. Then, the frame rate converter 400 sequentially reads

1 them for conversion so as to have a certain frequency ratio corresponding to the characteristics of
2 the display panel 1100.

3 Then, if the user supplies the OSD driving signal to the controller 200 by manipulating a
4 particular key of the key pad 1105 (see Fig. 10) of the display panel 1100 to use an on-screen display
5 1104, then the controller 200 supplies an OSD control signal 210 to the OSD generator 700 in
6 response to the user's OSD driving signal.

7 The OSD generator 700 supplies the first R-G-B signals 701 to the analog /digital converter
8 810 of the pivot circuit 800 in response to the OSD control signal 210.

9 Under this condition, the display panel 1100 has been turned by 90 degrees clockwise and,
10 therefore, the user has to supply a mode control signal to the controller 200 by pressing another
11 particular key of the key pad 1105 so that an on-screen display 1104 suitable for the turned status
12 of the display panel 1100 will be displayed.

13 If the user does not manipulate the particular key to generate the mode control signal, then
14 the on-screen display will be displayed with the letters and figures laid on their side as seen in Fig.
15

2.

16 Conversely, if the mode control signal is generated by the manipulation of the key by the
17 user, then the controller 200 supplies a pivot control signal 212 to the pivot circuit 800 so as to
18 display an on-screen display suitable to the turned status of the display panel 1100.

19 Then, the analog/digital circuit 810 of the B-pivot circuit 800a of the pivot circuit 800
20 sequentially receives the B data signals of the first R-G-B signals 701.

21 The first to eighth buffers 820a, ..., 820i, respectively, of the buffering section 820 store the

B data signals of the analog/digital circuit 810. Then, when the next B data signals are inputted, the preceding 8-bit B data signals are outputted.

That is, if the alphabet character "A" of Fig. 7 is taken as an example, the B data signals of the alphabet character "A" are supplied to the buffering section 820, starting from the first column C1 in the order of "00000000", "00111100", "00100100", "00100100", "00111100", "00100100", "00100100" and "00000000".

Under this condition, the G and R data signals of the alphabet character "A" are supplied in the same manner.

Then, the pivot controller 840 supplies the store position control signals 841 and the data selection control signals 842 to the data memory 830 and the data selector 850, respectively.

The data memory 830 then receives the B data signals of the alphabet character "A" from the first to eighth buffers 820a, ..., 820i, respectively, of the buffering section 820 so as to store them.

However, the data memory 830 stores in a position-converting manner the storing address of the B data signals of the alphabet character "A" (which are inputted from the first to eighth buffers of the buffering section 820) in response to the storing position control signals of the pivot controller 840.

That is, the B data signals "00000000" which correspond to the first column C1, and which are first outputted from the buffering section 820, are stored in the first storing positions of the respective columns C1, C2, C3, C4, C5, C6, C7 and C8 of the alphabet character "A" of Fig. 8, that is, in the storing positions of the first row R1.

The B data signals "00111100" corresponding to the second column C2 for the alphabet

1 character "A" of Fig. 7, which are outputted next, are stored in the second storing positions of the
2 respective columns C1, C2, C3, C4, C5, C6, C7 and C8 for the alphabet character "A" of Fig. 8, that
3 is, in the second row R2.

4 Through this procedure, when the B data signals "00000000" corresponding to the eighth
5 column C8 for the alphabet character "A" of Fig. 7 are stored in the eighth positions of the respective
6 columns C1, C2, C3, C4, C5, C6, C7 and C8, that is, when they are stored in the eighth row R8, the
7 storing of the B data signals for the alphabet character "A" is completed.

8 The G and R data signals of the alphabet character "A" are stored in the data memory 830
9 through the same procedure as that of the B data signals. Further, alphabet characters "B", "C" and
10 "D" of Fig. 7 are also stored in data memory 830 through the same procedure.

11 Then, the data selector 850 receives, from the OSD generator 700, the B data signals of the
12 first R-G-B signal 701 which have not been converted in accordance with pivoting. Further, the
13 data selector 850 receives, from the data memory 830, the B data signals of the first R-G-B signals
14 701 which have been converted in accordance with pivoting.

15 The data selector 850 selects one set of the B data signals from among the B data signals of
16 the converted first R-G-B signals 701 and the non-converted first R-G-B signals 701 so as to supply
17 them, in the form of second R-G-B signals 801, to the scale converter 600.

18 Under this condition, the display panel 1100 has been turned, and a mode control signal has
19 been generated by the user. Therefore, the data selection control signal 842 is supplied as a signal
20 showing the pivot enable status.

21 Accordingly, the data selector 850 supplies the B data signals of the converted (converted

1 in accordance with pivoting) first R-G-B signals 701 to the scale converter 600 as second R-G-B
2 signals 801.

3 The scale converter 600 receives the second R-G-B signals 801 from the B, G and R-pivot
4 circuits 800a, 800b and 800c of the pivot circuit 800.

5 The scale converter 600 converts the second R-G-B signals 801 in response to the scale
6 control signals 208 from the controller 200.

7 Then, if the second R-G-B signals 602 which have been scale-converted by the scale
8 converter 600 are outputted, the panel driver 900 receives the second R-G-B signals 602 of the scale
9 converter 600 and provides a driving signal 901 to the display panel 1100 so as to drive the display
10 panel 1100.

11 The display panel 1100 receive power from the power supply 1000, and receives the second
12 R-G-B signals from the panel driver 900. Further, the display panel 1100 displays the second R-G-
13 B signals on the screen in the form of an on-screen display in response to the driving signal 901 of
14 the panel driver 900.

15 In this manner, if the user has turned the display panel 1100 by 90 degrees clockwise, the
16 R-G-B signals of the on-screen display are displayed after being pivoted and, therefore, the letters
17 and figures of the on-screen display 1104 are displayed in the normal manner as seen by the user.
18 This is illustrated in Fig. 10.

19 According to the present invention as described above, even in the case where the user turns
20 the screen body by 90 degrees for the sake of convenience, the letters and figures of the on-screen

display are displayed in the normal manner as viewed by the user.

Therefore, the user can use the on-screen display in a convenient manner, regardless of the turning or non-turning of the screen body. Further, even in the case where the chromatic signals and synchronizing signals are synthetically inputted instead of the first and second R-G-B signals, the same pivoting function is carried out.

In the above, the present invention was described based on the specific preferred embodiment, but it should be apparent to those ordinarily skilled in the art that various changes and modifications can be added without departing from the spirit and scope of the present invention, which are defined in the appended claims.

WHAT IS CLAIMED IS:

1. A video display apparatus with an on-screen display pivoting function, comprising:

an on-screen display (OSD) generating section for receiving horizontal/vertical synchronizing signals and clock signals, and for outputting first video signals in response to OSD control signals;

a pivot circuit section for receiving the first video signals, for storing in a position-converting manner a write address of the first video signals in correspondence with a pre-set pivot write address, and for converting the write address in response to the horizontal/vertical synchronizing signals and the clock signals so as to output the first video signals in the form of second video signals;

a scale converting section for furnishing the horizontal/vertical synchronizing signals and the clock signals to said OSD generating section and said pivot circuit section, respectively, and for receiving the second video signals so as to convert scales of the second video signals in response to scale control signals; and

a control section for furnishing the OSD control signals and the scale control signals to said OSD generating section and said scale converting section, respectively, in response to OSD driving signals, and for furnishing pivot control signals to said pivot control section in response to mode control signals generated by a user.

2. The video display apparatus as claimed in claim 1, wherein said pivot circuit section comprises:

an R-pivot circuit for receiving R-data signals of the first video signals from said OSD

generating section, for storing in a position-converting manner a write address of the R-data signals in correspondence with a pre-set pivot write address in response to the pivot control signals, and for converting the write address in response to the horizontal/vertical synchronizing signals and the clock signals so as to output the stored R-data signals in a form of R-data signals of the second video signals;

a G-pivot circuit for receiving G-data signals of the first video signals from said OSD generating section, for storing in a position-converting manner a write address of the G-data signals in correspondence with the pre-set pivot write address in response to the pivot control signals, and for converting the write address in response to the horizontal /vertical synchronizing signals and the clock signals so as to output the stored G-data signals in a form of G-data signals of the second video signals; and

a B-pivot circuit for receiving B-data signals of the first video signals from said OSD generating section, for storing in a position-converting manner a write address of the B-data signals in correspondence with the pre-set pivot write address in response to the pivot control signals, and for converting the write address in response to the horizontal /vertical synchronizing signals and the clock signals so as to output the stored B-data signals in a form of B-data signals of the second video signals.

3. The video display apparatus as claimed in claim 2, wherein each of said R, G and B pivot circuits comprises:

an analog/digital converting section for receiving relevant picture data signals of R, G and

B data signals, respectively, of the first video signals from said OSD generating section so as to convert them to digital signals;

a buffering section for receiving and storing the picture data signals from said analog/digital converting section, and for outputting previous picture data signals upon receiving next picture data signals from said analog/digital converting section;

a pivot controller for outputting storing position control signals and data selection control signals in response to the pivot control signals of said control section;

a data storing section for receiving and storing the picture data signals of said buffering section, and for storing in a position -converting manner a write address of the picture data signals of said buffering section in correspondence with the pre-set pivot write address in response to the storing position control signals; and

a data selector for receiving one of the picture data signals of the first video signals and the picture data signals of said data storing section, and for outputting said one of the picture data signals of the first video signals and the picture data signals of said data storing section in a form of second video signals.

4. The video display apparatus as claimed in claim 3, wherein said buffering section comprises eight buffers for storing 8-bit picture data signals from said analog/digital converting section.

5. A video display apparatus with an on-screen display pivoting function, comprising:

a power supply section for supplying power;

a display section for receiving the power from said power supply section, and for displaying a picture of externally inputted video signals to a user;

a signal converter/clock generator section for receiving horizontal /vertical synchronizing signals and video signals, for converting the video signals to first digital signals in response to first control signals, and for generating clock signals;

a decoder for receiving brightness/chromatic signals, and for converting the brightness/chromatic signals to second digital signals in response to second control signals;

a frame rate converter section for receiving the horizontal /vertical synchronizing signals and the video signals from said signal converter/clock generator section, for receiving the brightness/chromatic signals from said decoder, for storing the video signals in response to third control signals, and for converting the stored video signals so as to have a certain frequency ratio in correspondence with display characteristics of the display section;

an on-screen display (OSD) generating section for receiving the horizontal /vertical synchronizing signals and the clock signals, and for outputting first video signals in response to OSD control signals;

a pivot circuit section for receiving the first video signals, for storing in a position-converting manner a write address of the first video signals in correspondence with a pre-set pivot write address, and for converting the write address in response to the horizontal /vertical synchronizing signals and the clock signals so as to output the first video signals in the form of second video signals;

a scale converting section for furnishing the horizontal/vertical synchronizing signals and the

clock signals to said OSD generating section and said pivot circuit section, respectively, for converting scales of video signals of said frame rate converting section, and for receiving the second video signals so as to convert scales of the second video signals of said pivot circuit section in response to scale control signals;

a control section for furnishing the first, second and third control signals to said signal converting /clock generating section, said decoder and said frame rate converting section, respectively, for furnishing the OSD control signals and the scale control signals to said OSD generating section and said scale converting section, respectively, in response to OSD driving signals, and for furnishing pivot control signals to said pivot circuit section in response to mode control signals; and

a driving section for furnishing video signals and driving signals from said scale converting section to said display section.

6. The video display apparatus as claimed in claim 5, wherein said pivot circuit section comprises:

an R-pivot circuit for receiving R-data signals of the first video signals from said OSD generating section, for storing in a position-converting manner a write address of the R-data signals in correspondence with a pre-set pivot write address in response to the pivot control signals, and for converting the write address in response to the horizontal/vertical synchronizing signals and the clock signals so as to output the stored R-data signals in a form of R-data signals of the second video signals;

a G-pivot circuit for receiving G-data signals of the first video signals from said OSD generating section, for storing in a position -converting manner a write address of the G-data signals in correspondence with the pre-set pivot write address in response to the pivot control signals, and for converting the write address in response to the horizontal /vertical synchronizing signals and the clock signals so as to output the stored G-data signals in a form of G-data signals of the second video signals; and

a B-pivot circuit for receiving B-data signals of the first video signals from said OSD generating section, for storing in a position -converting manner a write address of the B-data signals in correspondence with the pre-set pivot write address in response to the pivot control signals, and for converting the write address in response to the horizontal /vertical synchronizing signals and the clock signals so as to output the stored B-data signals in a form of B-data signals of the second video signals.

7. The video display apparatus as claimed in claim 6, wherein each of said R, G and B pivot circuits comprises:

an analog/digital converting section for receiving relevant picture data signals of the R, G and B data signals, respectively, of the first video signals from said OSD generating section so as to convert them to digital signals;

a buffering section for receiving and storing the picture data signals from said analog/digital converting section, and for outputting previous picture data signals upon receiving next picture data signals from said analog/digital converting section;

9 a pivot controller for outputting storing position control signals and data selection control
10 signals in response to the pivot control signals of said control section;

11 a data storing section for receiving and storing the picture data signals of said buffering
12 section, and for storing in a position-converting manner a write address of the picture data signals
13 of said buffering section in correspondence with a pre-set pivot write address in response to store
14 position control signals; and

15 a data selector for receiving one of the picture data signals of the first video signals and the
16 picture data signals of said data storing section, and for outputting said one of the picture data signals
17 of the first video signals and the picture data signals of said data storing section in a form of second
18 video signals.

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7 frame memory so as to convert the video signals to have a certain frequency ratio in correspondence
8 with display characteristics of said display section.

1 10. The video display apparatus as claimed in claim 9, wherein said frame rate converter
2 generates said control inputs and provides said control inputs to said frame memory.

1 11. The video display apparatus as claimed in claim 5, wherein said OSD driving signals are
2 generated by the user.

1 12. The video display apparatus as claimed in claim 5, wherein said mode control signals
2 are generated by the user.

1 13. A video display apparatus having an on-screen display pivoting function, comprising:
2 on-screen display (OSD) generating means for outputting first video signals having a write
3 address in response to OSD control signals;

4 pivot circuit means for receiving the first video signals, for converting the write address of
5 the first video signals, and for outputting the first video signals in a form of second video signals
6 having scales;

7 scale converting means for receiving the second video signals and for converting the scales
8 of the second video signals in response to scale control signals; and

9 control means for furnishing the OSD control signals and the scale control signals to said

OSD generating means and said scale converting means, respectively, in response to OSD driving signals generated by a user input.

14. The video display apparatus as claimed in claim 13, wherein said pivot circuit means comprises:

an R-pivot circuit for receiving R-data signals of the first video signals from said OSD generating means, for storing a write address of the R-data signals in response to pivot control signals generated by said control means, and for converting the write address so as to output the R-data signals in a form of R-data signals of the second video signals;

a G-pivot circuit for receiving G-data signals of the first video signals from said OSD generating means and for converting the write address so as to output the stored G-data signals in a form of G-data signals of the second video signals; and

a B-pivot circuit for receiving B-data signals of the first video signals from said OSD generating means and for converting the write address so as to output the stored B-data signals in a form of B-data signals of the second video signals.

15. The video display apparatus as claimed in claim 14, wherein each of said R,G and B pivot circuits comprises:

an analog/digital converting section for receiving relevant picture data signals of R,G and B data signals, respectively, of the first video signals from said OSD generating means so as to convert them to digital signals;

a buffering section for receiving and storing the picture data signals from said analog/digital converting section, and for outputting previous picture data signals upon receiving next picture data signals from said analog/digital converting section;

a pivot controller for outputting storing position control signals and data selection control signals in response to pivot control signals from said control means;

a data storing section for receiving and storing the picture data signals of said buffering section, and for storing a write address of the picture data signals of said buffering section in response to the storing position control signals; and

a data selector for receiving one of the picture data signals of the first video signals and the picture data signals of said data storing section, and for outputting said one of the picture data signals of the first video signals and the picture data signals of said data storing section in a form of second video signals.

16. The video display apparatus as claimed in claim 15, wherein said buffering section comprises eight buffers for storing 8-bit picture data signals from said analog/digital converting section.

17. The video display apparatus as claimed in claim 13, further comprising:

signal converting/clock generating means for receiving horizontal/vertical synchronizing signals and video signals, for converting the video signals to first digital signals in response to first control signals from said control means, and for generating clock signals.

1 18. The video display apparatus as claimed in claim 17, further comprising:

2 decoder means for receiving brightness/chromatic signals, and for converting the
3 brightness/chromatic signals to second digital signals in response to second control signals from said
4 control means.

1 19. The video display apparatus as claimed in claim 18, further comprising:

2 frame rate converting means for receiving the horizontal/vertical synchronizing signals and
3 the first video signals from said signal converting/clock generating means, for receiving the
4 brightness/chromatic signals from said decoder means, for storing the first video signals in response
5 to third control signals from said control means, and for converting the stored first video signals so
6 as to have a certain frequency ratio in correspondence with display characteristics of a display
7 section.

ABSTRACT

A video display apparatus has an on-screen display pivoting function in which, even when the user arbitrarily pivots the monitor of a computer system, the on-screen display is normally displayed. An on-screen display (OSD) generating section receives horizontal/vertical synchronizing signals and clock signals, and outputs first video signals in response to OSD control signals. A pivot circuit section receives the first video signals, stores a write address of the first video signals in a position-converting manner and in correspondence with a pre-set pivot write address, and converts the write address in response to the horizontal /vertical synchronizing signals and the clock signals so as to output the first video signals in the form of second video signals. A scale converting section furnishes the horizontal/vertical synchronizing signals and the clock signals to the OSD generating section and the pivot circuit section, respectively, and receives the second video signals so as to convert scales of the second video signals. A control section furnishes the OSD control signals and scale control signals to the OSD generating section and the scale converting section, respectively, and furnishes pivot control signals to the pivot control section in response to mode control signals generated by the user.

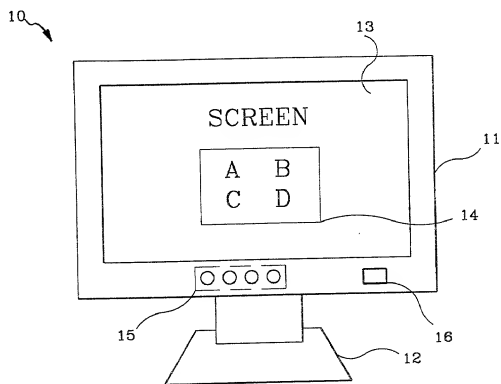


Fig. 1

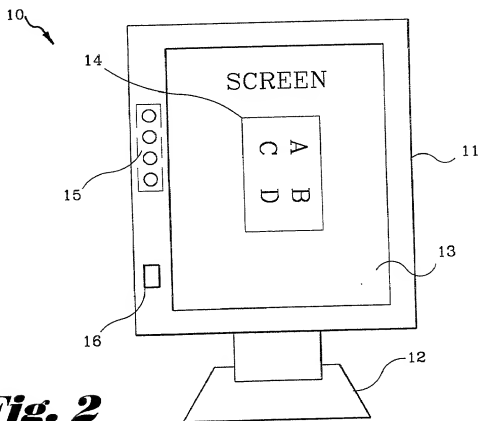


Fig. 2

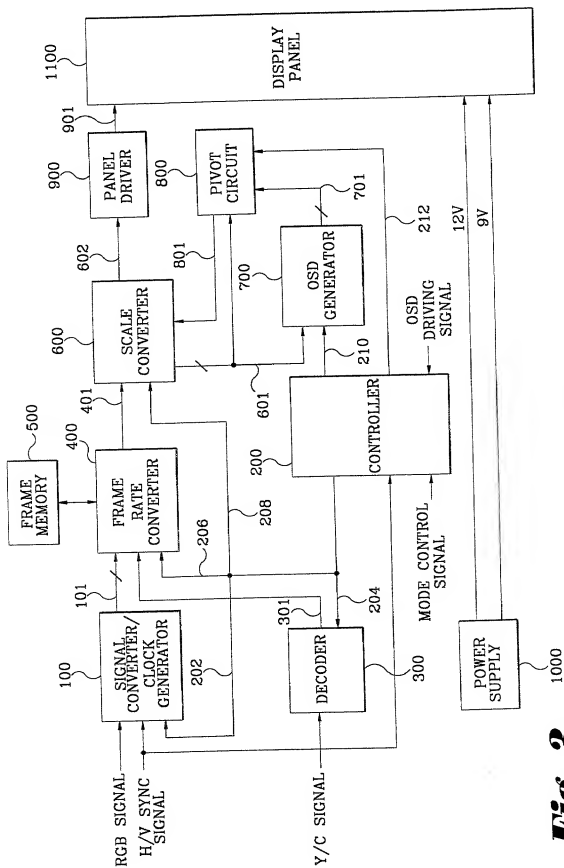


Fig. 3

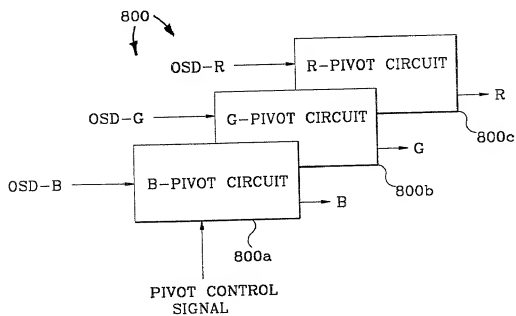


Fig. 4

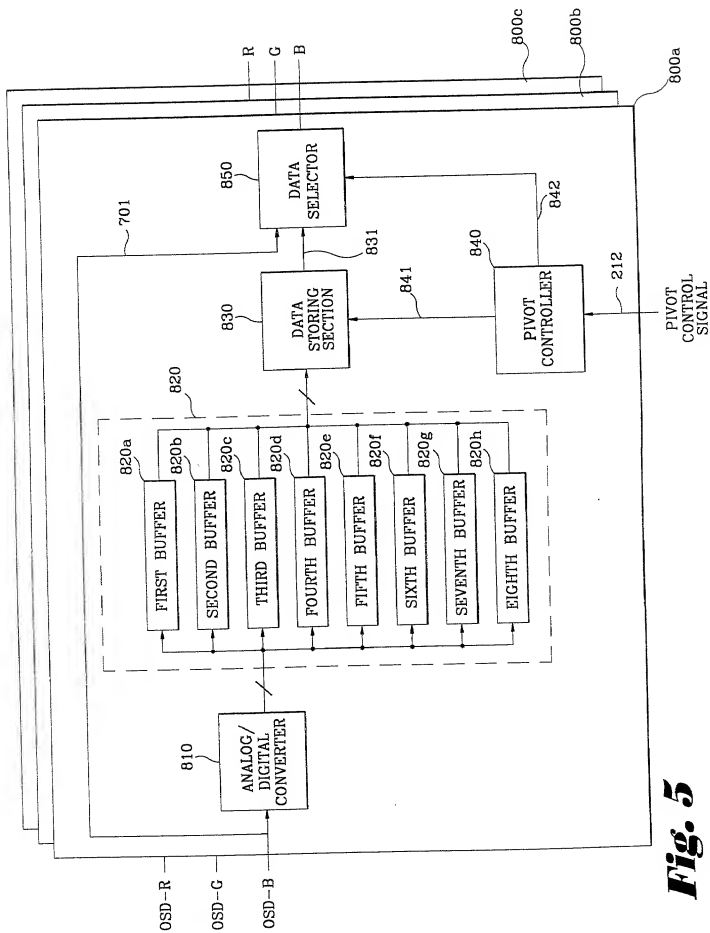


Fig. 5

	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	.	.	.
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4	0	1	0	1	0	0	1	0	0	1	0	0	0	0	0	1	.	.	.
5	0	1	0	1	0	0	1	0	0	1	0	0	0	0	0	1	.	.	.
6	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0			
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8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
c8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
3	0	1	1	1	1	1	1	0	0	1	0	0	0	0	1	0			
4	0	1	0	0	1	0	0	0	0	1	0	0	0	0	1	0	.	.	.
5	0	1	0	0	1	0	0	0	0	1	0	0	0	0	1	0	.	.	.
6	0	1	1	1	1	1	1	0	0	0	1	1	1	1	0	0			
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
c8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
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Fig. 8

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Fig. 9

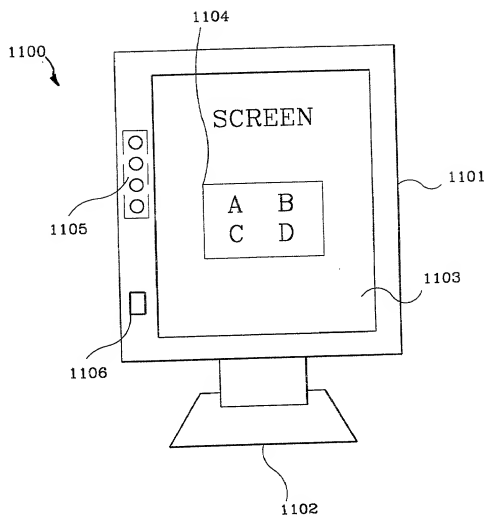


Fig. 10

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Young-Chan KIM

Serial No.: *to be assigned*

Examiner: *to be assigned*

Filed: 5 October 1999

Art Unit: *to be assigned*

For: VIDEO DISPLAY APPARATUS WITH ON-SCREEN DISPLAY PIVOTING
FUNCTION

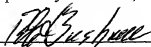
TRANSMITTAL OF DECLARATION

Assistant Commissioner
for Patents
Washington, D.C. 20231

Sir:

This transmittal accompanies a Declaration without the signature by the inventor(s), for the
above-captioned application. A Substitute Declaration with the inventor(s)'s signature will be filed
upon receipt of the Serial No. for the above-captioned application.

Respectfully submitted,


Robert E. Bushnell,
Attorney for the Applicant
Registration No.: 27,774

Suite 300, 1522 "K" Street, N.W.
Washington, D.C. 20005
(202) 638-5740

Folio: P55842
Date: 10/05/99
I.D.: REB/na

USE PREVIOUS EDITIONS OF THIS FORM FOR APPLICATIONS FILED BEFORE JANUARY 1, 1997.

I, the undersigned, being the inventor or the joint inventor, do hereby declare that

My residence, post office address and citizenship are as stated next to my name.

I believe that I am the original, first and sole (if only one name is listed below), or an original, first and joint inventor (if plural names are listed below), of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE: VIDEO DISPLAY APPARATUS WITH ON-SCREEN DISPLAY PIVOTING FUNCTION

the specification of which either is attached hereto or otherwise accompanies this Declaration, or:

☐ was filed in the U.S. Patent & Trademark Office on _____ and assigned Serial No. _____

☐ and (if applicable) was amended on _____

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability and to the examination of this application in accordance with Title 37 of the Code of Federal Regulations §1.56. I hereby claim foreign priority benefits under Title 35, U.S. Code §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT International application which designated at least one country other than the United States, or §119(c) of any United States provisional application(s), listed below and have also identified below any foreign applications for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

19077 / 1999	Republic of Korea	26 May 1999	Priority Claimed: Yes [X] No []
(Application Number)	(Country)	(Day/Month/Year filed)	
_____			Yes [] No []
(Application Number)	(Country)	(Day/Month/Year filed)	

I hereby claim the benefit under Title 35, U.S. Code, §120, of any United States application(s), or §365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application(s) in the manner provided by the first paragraph of Title 35, U.S. Code, §112, I acknowledge the duty to disclose information material to patentability as defined in Title 37, The Code of Federal Regulations, §1.56(a) which became available between the filing date of the prior application and the national or PCT international filing date of this application:

_____	_____	_____
(Application Serial No.)	(Filing Date)	(STATUS: patented, pending, abandoned)

_____	_____	_____
(Application Serial No.)	(Filing Date)	(STATUS: patented, pending, abandoned)

I hereby revoke all previously granted powers of attorney and appoint the following attorneys: Robert E. Bushnell, Reg. No. 27,774, Michael D. Parker, Reg. No. 24,978, and Henry M. Zykoris, Reg. No. 27,477, to prosecute this application and to transact all business in the U.S. Patent & Trademark Office connected therewith and with any divisional, continuation, continuation-in-part, reissue or re-examination application, with full power of appointment and with full power to substitute an associate attorney or agent, and to receive all patents which may issue thereon, and request that all correspondence be addressed to:

Robert E. Bushnell,
Attorney-at-Law
Suite 300, 1522 "K" Street, N.W.
Washington, D.C. 20005-1202
Payer No. 008439
Area Code: 202-638-5740

I HEREBY DECLARE that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 U.S. Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

FULL NAME OF FIRST OR SOLE INVENTOR: YOUNG-CHAN KIM Citizenship: Republic of Korea
Inventor's signature: Y. C. KIM Date: 51 October, 1999
Residence & Post Office Address: 505-1302 Semmaul Apt, Hoge-dong, Dongan-gu, Anyang-city, Kyungki-do, Republic of Korea

FULL NAME OF SECOND JOINT INVENTOR: _____ Citizenship: _____
Inventor's signature: _____ Date: _____
Residence & Post Office Address: _____

FULL NAME OF THIRD JOINT INVENTOR: _____ Citizenship: _____
Inventor's signature: _____ Date: _____
Residence & Post Office Address: _____

FULL NAME OF FOURTH JOINT INVENTOR: _____ Citizenship: _____
Inventor's signature: _____ Date: _____
Residence & Post Office Address: _____

☐ Additional inventors are being named on separately numbered sheets attached hereto.

DECLARATION

AS A BELOW NAMED INVENTOR, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name.

I believe that I am the original, first and sole (if only one name is listed below), or an original, first and joint inventor (if plural names are listed below), of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE: VIDEO DISPLAY APPARATUS WITH ON-SCREEN DISPLAY PIVOTING FUNCTION

the specification of which either is attached hereto or otherwise accompanies this Declaration, or:



was filed in the U.S. Patent & Trademark Office on _____ and assigned Serial No. _____.



and (if applicable) was amended on _____.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability and to the examination of this application in accordance with Title 37 of the Code of Federal Regulations §1.56. I hereby claim foreign priority benefits under Title 35, U.S. Code §119(a)-(4) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT International application which designated at least one country other than the United States, or §119(e) of any United States provisional application(s), listed below and have also identified below any foreign applications for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

19077 /1999	Republic of Korea	26 May 1999
(Application Number)	(Country)	(Day/Month/Year filed)

Priority Claimed:
Yes [X] No []

(Application Number)	(Country)	(Day/Month/Year filed)
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Yes [] No []

I hereby claim the benefit under Title 35, U.S. Code, §120, of any United States application(s), or §365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application(s) in the manner provided by the first paragraph of Title 35, U.S. Code, §112, I acknowledge the duty to disclose information material to patentability as defined in Title 37, The Code of Federal Regulations, §1.56(a) which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(STATUS: patented, pending, abandoned)
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(Application Serial No.)	(Filing Date)	(STATUS: patented, pending, abandoned)
--------------------------	---------------	--

I hereby revoke all previously granted powers of attorney and appoint the following attorneys: Robert E. Bushnell, Reg. No. 27,774, Michael D. Parker, Reg. No. 34,973, and Henry M. Zykorie, Reg. No. 27,477, to prosecute this application and to transact all business in the U.S. Patent & Trademark Office connected herewith and with any divisional, continuation, continuation-in-part, reissue or re-examination application, with full power of appointment and with full power to substitute an associate attorney or agent, and to receive all patents which may issue thereon, and request that all correspondence be addressed to:

Robert E. Bushnell,
Attorney-at-Law
Suite 300, 1522 "K" Street, N.W.
Washington, D.C. 20005-1202

Payor No. 008439
Area Code: 202-638-5740

I HEREBY DECLARE that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 U.S. Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

FULL NAME OF FIRST OR SOLE INVENTOR: YOUNG-CHAN KIM Citizenship: Republic of Korea

Inventor's signature: _____

Residence & Post Office Address: 505-1302 Sammaul Apt., Hoge-dong, Dongan-gu, Anyang-city, Kyungki-do, Republic of Korea

FULL NAME OF SECOND JOINT INVENTOR: _____ Citizenship: _____

Inventor's signature: _____

Residence & Post Office Address: _____

FULL NAME OF THIRD JOINT INVENTOR: _____ Citizenship: _____

Inventor's signature: _____

Residence & Post Office Address: _____

FULL NAME OF FOURTH JOINT INVENTOR: _____ Citizenship: _____

Inventor's signature: _____

Residence & Post Office Address: _____

☐ A Declaration of Invention has been made and an associate inventor of the above-named inventor is named as an inventor on the application.